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criticism, namely, whether in the vast body of admirable and trustworthy information, which makes the book a veritable cyclopedia, the essentially didactic and disciplinary aspects of the subject have not suffered an undesirable and unnecessary eclipse. If the primary aims of physiology in the schools be informational, and the importance of this will not be questioned, then some subordination of those methods of observation and experiment so distinctive of science may in measure be justified. But even in that case it may well be questioned whether these very methods do not afford a *distinctive type* of information, more vital and impressive, and at the same time incomparably more abiding; and this the reviewer believes to be the case. It is much to be regretted, therefore, that at least some provision had not been made in the body of the text and throughout for pertinent experiment and demonstration. The almost total absence of anything savoring of laboratory directions is hardly atoned for in the brief prefatory statement that varying facilities in different schools made this less imperative. The very presence of such directions would have served to promote a larger and more uniform system of judicious laboratory practise.

Upon the whole, the book is easily among the very best now available, and indeed far and away superior to the average text-book of similar scope. It marks a decided step in advance, and will doubtless find a wide and growing field of usefulness, both in the upper years of the high school and beginning courses in college.

In its typography and other mechanical aspects the book seems exceptionally free from glaring defects, and maintains the high repute of the publishers in this line of book-making.

C. W. H.

SCIENTIFIC JOURNALS AND ARTICLES

The American Naturalist for March contains but three papers, though these are of considerable length. The first, 'Studies on the *Ophioglossaceæ*,' by D. H. Campbell, deals mainly with the morphology of the peculiar, fertile leaf segment, or sporophyll. R. W. Shufeldt discusses 'Polygamy and Other

Modes of Mating among Birds,' the object being avowedly to throw some light on the question of mating among mankind. A large number of statements are made, the bearing of which is to be given in another paper. Outram Bangs writes 'On the Wood Rails, Genus *Aramides*, occurring North of Panama,' describing as new one form from Mexico to which the name *Aramides albiventris mexicanus* is given.

The American Museum Journal for March has illustrated articles on the mounting of 'The African Lion Hannibal,' 'The Naosaurus, or Ship-Lizard,' and 'A New Eskimo Exhibit,' and contains the lecture schedule for the month. The mounted lion, and the bizarre skeleton of Naosaurus are respectively triumphs of the taxidermist and preparator of fossils.

The Museums Journal of Great Britain for February has various articles on museum cases; the first, by H. Bantry White on 'Some Improvements in Museum Cases,' describes methods of making iron cases by which their cost has been greatly reduced. F. A. Lucas gives briefly his ideas relative to 'The Structure and Arrangement of Museum Cases,' finding a lack of effect in iron cases and emphatically endorsing the bay system of arrangement. 'The Liverpool Museum Extension' deals with the rearrangement of the zoological and anthropological collections in a consecutive, educational plan. The view of the zoological hall impresses one with the idea that it is a little too narrow for the best results.

THE Springfield Museum of Natural History has issued a 'leaflet' entitled 'Bird Migration,' giving the dates of arrival of one hundred species of birds found within ten miles of Springfield, during the springs of 1901 to 1906, with spaces reserved up to 1910. The list is arranged chronologically for 1901, although there is considerable variation in the dates of arrival of the species subsequently.

The Bulletin of the Charleston Museum for March is mainly devoted to an excellent article by Mrs. Paul M. Rea on 'The Relation of the Museum to the Schools.'

The Science and Art Museum Dublin is issuing a series of 'guides' to the collections, which are sold at the nominal price of a penny. The last two of the series, devoted to armor, and to arms (European) are by M. S. D. Westropp and comprise a descriptive catalogue of the specimens in the museum, with a large amount of general information as to the classes of objects described. They are extremely interesting and models of their kind.

SOCIETIES AND ACADEMIES

THE GEOLOGICAL SOCIETY OF WASHINGTON

At the 187th meeting of the society, on February 13, 1907, Mr. J. S. Diller presented briefly the results of extended studies by him on the age of the auriferous gravels in Oregon and the discovery of marine Eocene fossils in the same.

Mr. Fred. E. Wright exhibited artificial crystals of cuprite and an asbestos-like mineral of the composition of tremolite, both formed at high temperatures and under considerable pressure.

Regular Program

Mr. Whitman Cross gave a brief review of the recent article on 'New Textual Terms for Igneous Rocks' by Cross, Iddings, Pirsson and Washington in the *Journal of Geology*, XIV., 692-707, and emphasized the underlying principles which guided the authors in their classification and description of the textures of igneous rocks.

The Pine Mountain Fault: Mr. R. W. STONE.

Pine Mountain forms part of the boundary between Kentucky and Virginia and is a long narrow ridge having a general elevation of 3,000 feet. This discussion deals only with the northern end of the mountain from Pound Gap to Big Sandy River. The Virginia side of the mountain is comparatively steep, the strata dipping southeast at angles up to 25 degrees, while the north or Kentucky side is precipitous and a good example of a fault scarp. The great fault which formed the mountain is on the north side and parallels the crest of the ridge for many miles. In the 'breaks' where Russell Fork of Big Sandy

River passes the end of the mountain in a gorge 1,000 feet deep, a diagrammatic section shows clearly the uplifting and over-riding of the Lee conglomerate on the upturned edges of the Coal Measures. In the coal field immediately west of the Pine Mountain the Lower Elkhorn seam commonly shows a fifteen-inch bench of laminated coal. It has every appearance of squeezing and movement, the coal being crushed to a flaky condition and the surfaces of the flakes slickensided. The lamination may be parallel to the bedding, but is often tilted or contorted; it decreases and disappears at a distance of several miles from the mountain.

Phosphate Deposits in the Western United States: Mr. F. B. WEEKS and Mr. W. F. FERRIER.

It has been found during the past few years that the limestone strata of the upper Carboniferous of the Central Cordilleran region include a series of oolitic beds containing a variable percentage of P_2O_5 and varying in thickness from a mere trace to ninety feet. These beds are known to occur in Idaho, Wyoming, Utah and Nevada, and future exploration may show that they have a still wider distribution. They are usually underlain by blue-gray compact limestone strata which in turn pass into sandy limestones and yellow sandstones. The phosphate series consists of alternating layers of black phosphatic material, shale and hard blue or brown compact limestone which is often fossiliferous with *Rhynchonella*, *Chonetes* and *Euomphalotrochus* as characteristic forms. Within the series the phosphate beds vary in thickness from a few inches to ten feet, some of which are almost entirely oolitic in character and commercially valuable because of their high content of P_2O_5 , the average analysis of car-load lots giving 32 per cent. P_2O_5 equivalent to 70 per cent. bone phosphate.

In Utah the phosphate series is exposed in Weber Canyon near Croydon and also near Woodruff; in Wyoming, near Sage and also near Cokeville, where it extends along the west face of the Sublette Range on the east side of the valley of Thomas Fork; on the east side of Bear Lane and along the west